WHAT IS CLAIMED IS:

1. An optical signal processing device comprising:

an optical demultiplexer having an input port and a plurality of output ports, said input port being adapted to accept WDM signal light obtained by wavelength division multiplexing a plurality of optical signals having different wavelengths;

an optical multiplexer having an output port and a plurality of input ports;

a plurality of optical paths for respectively connecting said plurality of output ports and said plurality of input ports;

at least one delay adjuster provided on at least one of said plurality of optical paths;

a detector for detecting the modulation-phase of at least one of said plurality of optical signals; and

a controller for controlling said delay adjuster according to said modulation-phase detected by said detector.

2. An optical signal processing device according to claim 1, further comprising an optical modulator connected to said output port of said optical multiplexer for performing intensity modulation according to an RZ signal having the same bit rate as that of each of said

plurality of optical signals.

3. An optical signal processing device according to claim 1, wherein said detector comprises:

an optical filter for passing an optical signal having a reference wavelength;

a circuit for regenerating a reference clock according to said optical signal passed through said optical filter;

a tunable optical filter for passing an optical signal having an arbitrary wavelength;

a circuit for regenerating a clock according to said optical signal passed through said tunable optical filter; and

a phase comparator for comparing the phases of said reference clock and said clock.

4. An optical signal processing device according to claim 1, wherein said detector comprises:

a tunable optical filter for passing an optical signal having an arbitrary wavelength;

a circuit for regenerating first and second clocks according to a first optical signal having a first wavelength passed through said tunable optical filter and a second optical signal having a second wavelength passed through said tunable optical filter, respectively; and

a phase comparator for comparing the phases of said first and second clocks.

5. An optical signal processing device according to claim 1, wherein said detector comprises:

an optical filter for passing an optical signal having a reference wavelength;

a circuit for generating a reference clock according to said optical signal passed through said optical filter;

a tunable optical filter for passing an optical signal having an arbitrary wavelength;

a circuit for regenerating a clock according to said optical signal passed through said tunable optical filter; and

a phase comparator for comparing the phases of said reference clock and said clock.

6. An optical signal processing device according to claim 1, wherein said detector comprises:

a pulse light source for generating reference pulse light;

an optical filter for passing an optical signal having an arbitrary wavelength; and

a gain saturation device for accepting said optical signal passed through said optical filter and said

reference pulse light;

said controller comprising a circuit for controlling said delay adjuster so that the average power of light output from said gain saturation device is reduced.

7. An optical signal processing device according to claim 6, wherein said reference pulse light has a clock frequency 1/N (N is a natural number) times the clock frequency of each of said plurality of optical signals.

8. An optical signal processing device according to claim 6, further comprising means for detecting the distribution of pulse heights of each of said plurality of optical signals according to the average power of said light output from said gain saturation device.

9. An optical signal processing device according to claim 1, wherein said detector comprises:

a first optical filter for passing an optical signal having a first wavelength;

a second optical filter for passing an optical signal having a second wavelength; and

a gain saturation device for accepting said optical signal passed through said first optical filter and said optical signal passed through said second optical filter;

said controller comprising a circuit for controlling said delay adjuster so that the average power of light output from said gain saturation device is reduced.

10. An optical signal processing device according to claim 1, wherein said detector comprises:

a pulse light source for generating reference pulse light;

an optical filter for passing an optical signal having an arbitrary wavelength; and

a saturable absorption device for accepting said optical signal passed through said optical filter and said reference pulse light;

said controller comprising a circuit for controlling said delay adjuster so that the average power of light output from said saturable absorption device is increased.

11. An optical signal processing device according to claim 10, wherein said reference pulse light has a clock frequency 1/N (N is a natural number) times the clock frequency of each of said plurality of optical signals.

12. An optical signal processing device according to claim 10, further comprising means for detecting the

distribution of pulse heights of each of said plurality of optical signals according to the average power of said light output from said saturable absorption device.

13. An optical signal processing device according to claim 1, wherein said detector comprises:

a first optical filter for passing an optical signal having a first wavelength;

a second optical filter for passing an optical signal having a second wavelength; and

a saturable absorption device for accepting said optical signal passed through said first optical filter and said optical signal passed through said second optical filter;

said controller comprising a circuit for controlling said delay adjuster so that the average power of light output from said saturable absorption device is increased.

14. An optical signal processing device according to claim 1, wherein said delay adjuster comprises at least two optical waveguides having different optical path lengths, and at least two optical switches for switching said at least two optical waveguides.

15. An optical signal processing device according to claim 1, wherein said delay adjuster comprises a

member having a piezoelectric effect, an optical fiber wound around said member, and a variable voltage source for applying a voltage to said member.

16. An optical signal processing device comprising a phase adjusting section and an all-optical regenerating section, said phase adjusting section comprising:

an optical demultiplexer having an input port and a plurality of output ports, said input port being adapted to accept WDM signal light obtained by wavelength division multiplexing a plurality of optical signals having different wavelengths;

an optical multiplexer having an output port and a plurality of input ports;

a plurality of optical paths for respectively connecting said plurality of output ports and said plurality of input ports;

at least one delay adjuster provided on at least one of said plurality of optical paths;

a detector for detecting the modulation-phase of at least one of said plurality of optical signals; and

a controller for controlling said delay adjuster according to said modulation-phase detected by said detector.